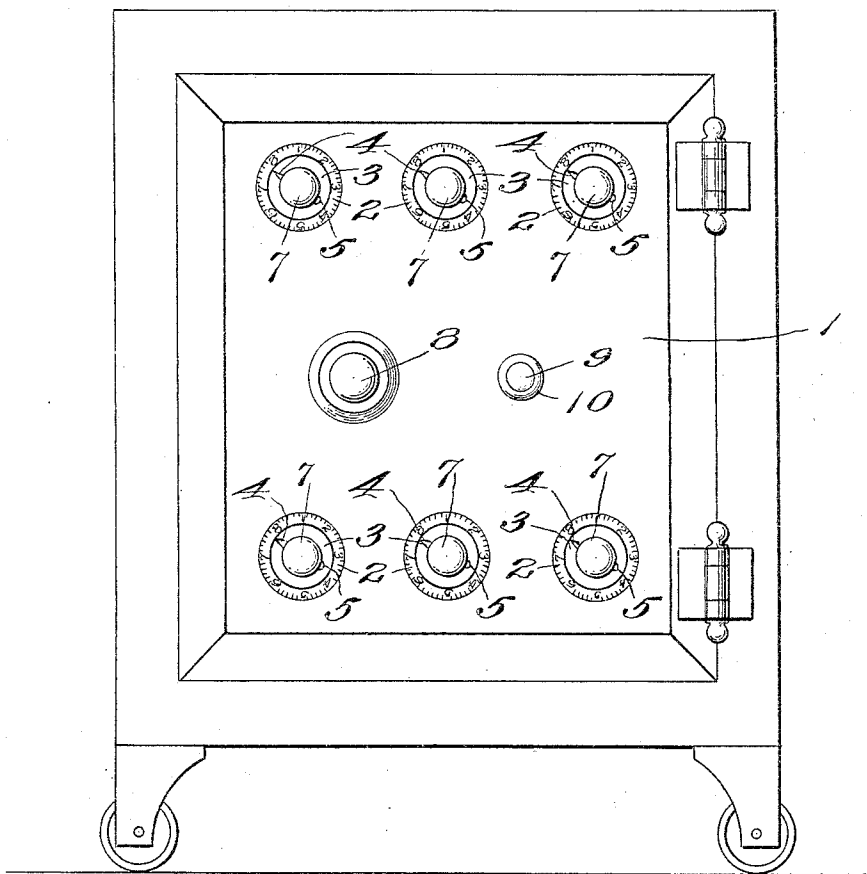


O. ANDERSON.  
 PERMUTATION LOCK.  
 APPLICATION FILED FEB. 11, 1909.

939,887.

Patented Nov. 9, 1909.  
 3 SHEETS—SHEET 1.

*Fig. 1.*



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*Harold Maynard*

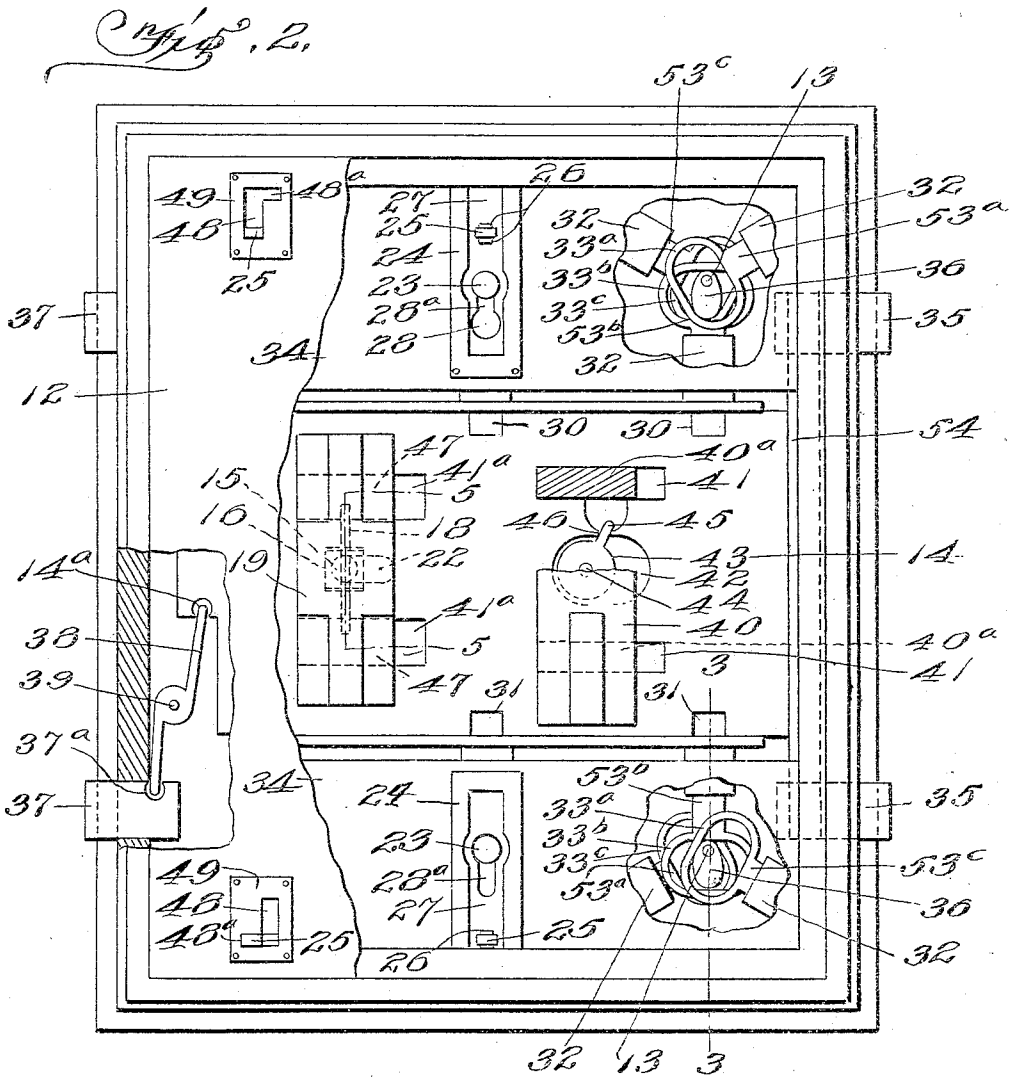
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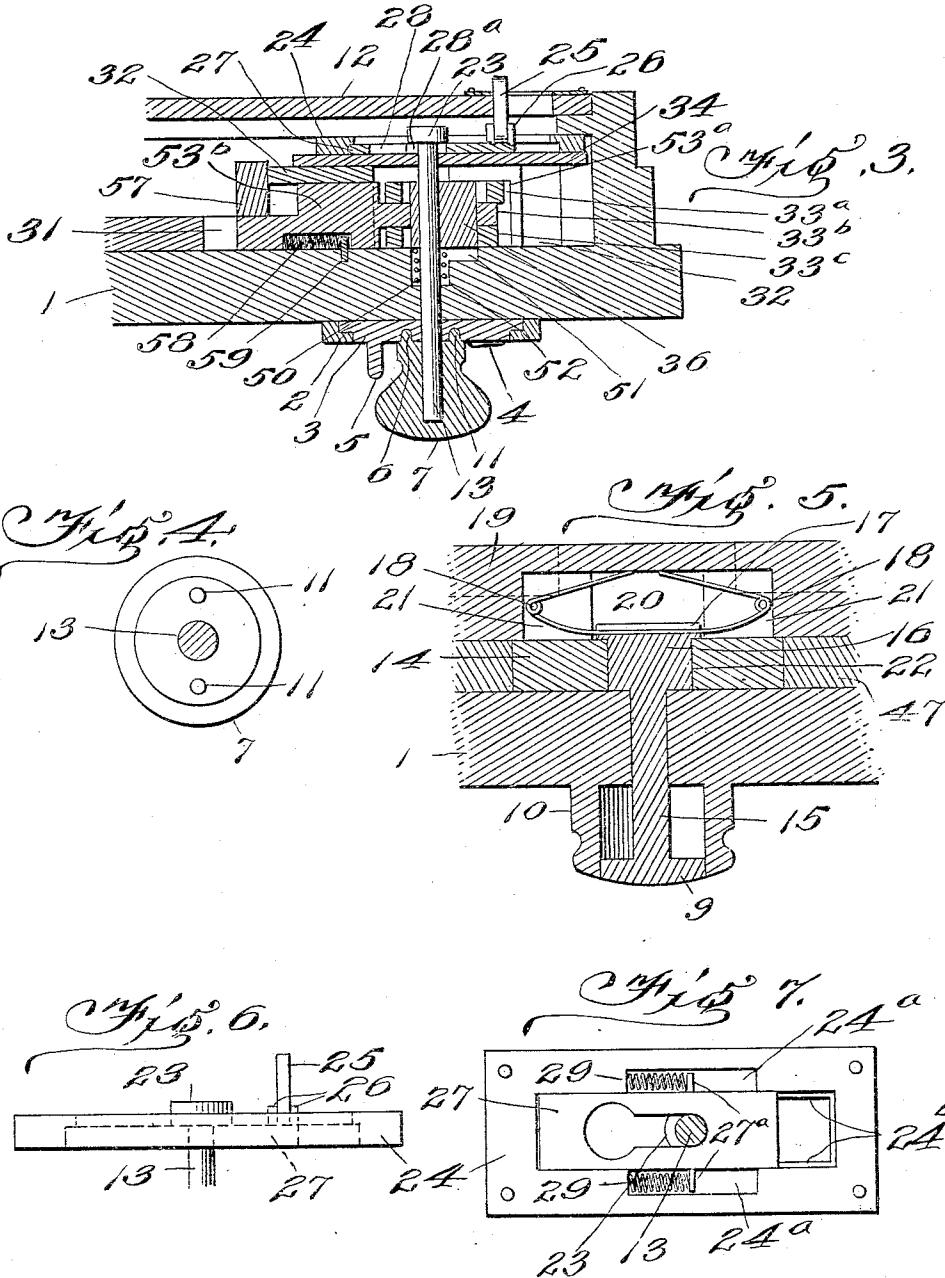
Attorney

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*[Signature]*  
 Harold Ellsworth

Inventor  
 Otto Anderson.  
 By *[Signature]*  
 Attorney

# UNITED STATES PATENT OFFICE.

OTTO ANDERSON, OF CLEVELAND, OHIO.

## PERMUTATION-LOCK.

939,887.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed February 11, 1909. Serial No. 477,279.

*To all whom it may concern:*

Be it known that I, OTTO ANDERSON, subject of Gustav Adolph III, King of Sweden, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification.

This invention relates to permutation locks and comprises a plurality of individually controlled locking devices inside the safe door, any one of which will prevent release of the safe door bolts and all of which must be forced into a certain position by means of outer knobs and dials before the door can be opened.

The invention also comprises several other novel features which will be fully described hereinafter.

The object of the invention is to form a safe lock, having a combination that can be changed at will, and which is noiseless, and whose controlling knobs have an equal stress at any position so that no movement of mechanism inside the safe can be detected.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a safe provided therewith. Fig. 2 is a rear elevation of the safe door, parts thereof being broken away, to expose inner mechanisms; Fig. 3 is a sectional view on line 3—3 of Fig. 2. Fig. 4 is a bottom view of knob 7. Fig. 5 is a sectional view on line 5—5 of Fig. 2. Fig. 6 is a side view of the device which controls means for changing the combination. Fig. 7 is a bottom view of same.

Similar figures refer to similar parts throughout the several drawings.

The lock mechanism is inclosed between the front door plate 1 and back plate 12. This door is hinged to the safe by any hinges suitable for the purpose. Door bolts 35 and 37 when the door is closed and locked, project into proper recesses in the door frame and hold the door closed irrespective of the hinges.

Door bolts 35 are secured to a central sliding plate 14 by an upright piece 54. Door bolts 37 are each actuated by the movement of plate 14 by means of a lever 38 fulcrumed

at 39 and having its arms engaged in notches 37<sup>a</sup> and 14<sup>a</sup> in the bolts and plate respectively. In this way the bolts 37 are given an opposite movement to bolts 35.

Plate 14 is actuated by a finger 45 projecting from cylinder 43 which rotates or rather rocks on shaft 44 having an outer knob 8 for manually operating same. Finger 45 fits in a notch 46 and as it is turned forces plate 14 in the same direction. The recess 42 allows plate 14 to move in either direction. Shaft 44 is pivoted at its outer end in plate 1 and at the inner end in a block 40 offset from plate 1 by projecting supports 40<sup>a</sup> which extend through plate slots 41 in plate 14 to allow the movement. Plate 14 can only be actuated by knob 8 after bolt elements 30 are withdrawn from recesses 31 in said plate, and when a plunger 15 is pushed inward by button 9 in guard 10. At the inner end of plunger 15 is an enlarged portion or block 16 which when the door is locked is forced into a square hole in the plate 14, which hole has a laterally extending slot 22, by means of springs 18 in recess 21, which springs fit in a groove 17 in the inner side of block 16. By pressing the plunger inwardly block 16 is forced into recess 20 in block 19 and plate 14 is allowed to slide. Slot 22 is long enough to allow the movement, but plunger 15 prevents plate 14 from moving unless block 16 is forced into recess 20. Block 19 is bridged over plate 14 by blocks 47 in slots 41<sup>a</sup>.

A plurality of shafts 13 extend through the door plate 1. A cam 36 is secured to each shaft inside of the plate, and revolves in elliptical loops 33<sup>a</sup>, 33<sup>b</sup> and 33<sup>c</sup> at the inner ends of reciprocating tumblers 53<sup>a</sup>, 53<sup>b</sup> and 53<sup>c</sup> respectively. Each tumbler 53<sup>a</sup>, 53<sup>b</sup> and 53<sup>c</sup> has a guide 32 and a spring 58 in an inner recess with its one end in compression against a stop 59 and tending to force said tumbler outwardly. The guides 32 extend radially from the shaft 13 and at equal angles from each other, so as to make equal stress on shaft 13 at all positions. One of each set of guides 32 is adjacent to and at right angles to plate 14. The tumblers 53<sup>b</sup> in said guides 32 have toes which extend through partitions 57 and can be forced into or withdrawn from notches 31 in the upper

and lower edges of plate 14, the tumbler operating shafts 13 being located in rows above and below said plate. Each shaft 13 extends at its inner end through a partition 34 and through slides 27 located behind partitions 34 and has a head 23 on the inner end thereof. A coiled spring 50, in recess 52, of door plate 1, tends to force shaft 13 inward by pressure on cam 36. The sliding members or elements 27 each have ears or lugs 26, and pivoted thereto is a thumb piece 25. The slide has a hole 28 and a slot 28<sup>a</sup> extending therefrom. Each element 27 slides in a guide 24 having shoulders 24<sup>b</sup> and recesses 24<sup>a</sup> for springs 29 which are fastened in tension to pins 27<sup>a</sup> on the slides and to the ends of recesses 24<sup>a</sup>, and tend to pull the slide inwardly so that the shaft or spindle normally extends through slot 28<sup>a</sup>, but when the slide is pulled outwardly by means of a thumb piece 25, the hole 28 is brought directly behind head 23. The thumb pieces 25 extend through plate 12 and have guide plates 49 each having a slot 48 therein, with an offset 48<sup>a</sup> to hold the thumb-piece in outer position by turning or swinging it into the same.

On the outer end of each shaft 13 is a knob 7. 2 is a dial graduated to any suitable degree. An indicator plate 3 revolves in dial 2 and has an index 4 and thumb piece 5. Knob 7 has inner lugs 11 which engage in some of a ring of holes 6 in the indicator 3.

A recess 51 in the back of plate 1 is the same shape as cam 36 and will allow the cam to slip therein when in proper position, although the recess 51 can be located in various positions so as to require a separate combination to change the combination of the lock as hereinafter more fully described.

In operation, by turning each of knobs 7 to a certain position by means of indicator 3 and dial 2 the tumbler members 30 are all withdrawn from notches 31 in plate 14. Then by pressing in plunger 9 and turning knob 8 the plate 14 slides and withdraws door bolts 35 and 37 from the door frame and door is free to open. When the door is open the combination can be changed. If recesses 51 all extend outwardly the thumb pieces 25 are all engaged in offset 48<sup>a</sup> and shaft 13 can be pulled outwardly a short distance so as to disengage lugs 11 from holes 6 in plate 3. Then plate 3 can be turned to a new position and will therefore point to the number, where it is placed, to withdraw the corresponding tumbler 30. Obviously when turned to another position the tumbler will be advanced to engage the plate.

If the recesses 51 are located in various positions, the cams 36 must be brought to corresponding position by means of indicator 3 and dial 2. Then shafts 13 can be

pulled out and indicators 3 changed. The shaft 13 is then pushed in and thumb piece 25 released. The dial must then be turned back the number of degrees as it was turned from its open position to the position of recess 51. This gives the number at which the corresponding tumbler 30 withdraws from 14. In this last method of changing the combination, the plate 14, after door 1 is open, must be forced back to position to allow cams 36 to turn so the tumblers 30 will enter pockets 31.

I claim:

1. In a lock, the combination of a rotary knob and pin, an indicator plate mounted on the pin and arranged to be turned with respect thereto, the knob having projections engageable with the plate in various positions, the pin being movable lengthwise to disengage said projections, a tumbler operatively connected to said pin, and releasable means engageable with the pin to hold the same against lengthwise movement.

2. The combination of a door plate, a longitudinally movable pin extending through the same and having a knob on its outer end, a tumbler operatively connected to the pin, a dial and an index plate extending around the pin on the outer side of the door, the index plate being mounted to turn on the pin to vary the combination, and the knob being engageable with the indicator plate in the various positions of the latter and disengageable by longitudinal movement of the pin, and means on the inside of the door plate to prevent such longitudinal movement.

3. The combination of a door plate, a tumbler-actuating rotary pin movable lengthwise in the plate and having a knob and indicator at its outer end and a head at its inner end, the knob being normally engaged with the indicator and disengageable therefrom by pulling the pin outwardly, and a latch device engaging under the said head, on the inside of the door plate, to normally prevent said outward pull.

4. In a lock, the combination of a knob spindle, a cam thereon, and a series of sliding tumblers arranged symmetrically around the same and provided with springs pressing them against the cam with substantially equal force, one of said tumblers being active and the others being false.

5. In a lock, the combination of a knob spindle, a cam thereon, a sliding tumbler bearing against the cam and actuated by turning the spindle, and means to equalize the turning stress on the spindle in all positions of the cam.

6. In a lock, the combination of a knob spindle, a cam thereon, a sliding tumbler bearing against the cam and actuated by turning the spindle, and means to equalize

the turning stress on the spindle in all positions of the cam, comprising a plurality of false tumblers arranged symmetrically around the spindle and bearing against the  
5 cam, all of said tumblers being provided with springs pressing the same with substantially equal force against the cam.

In testimony whereof, I do affix my signature in presence of two witnesses.

OTTO ANDERSON.

Witnesses:

MONROE E. MILLER,  
JOHN A. BOMMHARDT.